

REMARKS

This application is amended in a manner to place it in condition for allowance.

**Status of the Claims**

Claim 1 is amended to include the features of claim 2.

Claim 3 is amended to depend from claim 1.

Claim 2 is cancelled.

Claims 1, 3-7 and 9-22 remain in this application.

**Claim Rejections-35 USC §103**

Claims 1, 4-7, 9, 10 and 21 stand rejected under 35 USC 103(a) as being unpatentable over KIM et al. EP 0827229 A2 ("KIM '229") in view of CHAO et al. US 4,581,105 ("CHAO"). This rejection is respectfully traversed for the reasons that follow.

The Official Action maintained the position that it would have been obvious to substitute the non-woven fiberglass separator of CHAO for the sintered glass separator of KIM '229.

However, the proposed combination fails to teach or suggest two or more pairs of electrodes and multiple partition walls in a bipolar stacked design, as recognized in the Official Action at page 7, lines 1-3. Moreover, the combination also fails to teach that each partition wall provides at least two types of channels, wherein the open spaces of one type of channel are in electrically conductive contact with the cathode, and the

open spaces of the other type are in electrically conductive contact with the anode.

Therefore, KIM '229 in view of CHAO fails to render obvious the invention of independent claims 1 and 21 (and dependent claims 4-7, 9, 10), and withdrawal of the rejection is respectfully requested.

Claims 1, 4-7, 9-10, 17 and 21 stand rejected under 35 USC 103(a) as being unpatentable over KIM et al. WO 01/04061 A1 ("KIM '061") in view of CHAO. This rejection is respectfully traversed for the reasons that follow.

The Official Action maintained the position that it would have been obvious to substitute the non-woven fiberglass separator of CHAO for the sintered glass separator of KIM '061.

However, as discussed above, the proposed combination fails to teach or suggest two or more pairs of electrodes and multiple partition walls in a bipolar stacked design, as recognized in the Official Action at page 7, lines 1-3. Moreover, the combination also fails to teach that each partition wall provides at least two types of channels, wherein the open spaces of each type of channel are in electrically conductive contact with the cathode, respectively the anode.

Therefore, KIM '061 in view of CHAO fails to render obvious the invention of independent claims 1 and 21 (and

dependent claims 4-7, 9, 10 and 17), and withdrawal of the rejection is respectfully requested.

Claims 2-3 and 19-20 were rejected under 35 USC 103(a) as being unpatentable over KIM '061 in view of CHAO, further in view of DAHLBERG U.S. 4,344,832 ("DAHLBERG"). This rejection is respectfully traversed for the reasons that follow.

The Official Action recognized, as noted previously, that the combination of KIM '061 and CHAO fails to teach or suggest two or more pairs of electrodes configured in a bipolar stacked design having multiple partition walls.

DAHLBERG was offered for teaching a fuel cell using a bipolar constructions with at least two adjacent fuel cells electrically connected.

The position of the Official Action was that it would have been obvious to modify the biofuel cell of KIM '061 and CHAO in view of DAHLBERG in order to provide a higher voltage output.

However, although the embodiments in figures 2, 3 and 4 of DAHLBERG comprise a repetition of structural elements, they do not provide a higher voltage output than an embodiment without such repetition (as in figure 1 of DAHLBERG).

The reason for this is that the embodiments in figures 2, 3 and 4 each repeating unit comprises a downwardly protruding membrane, and that all protruding portions are contacted to the (same volume of) acidified water that is present below the units.

In this way, the acidified water makes an electrical connection between the repeating units. Thus, an addition of the voltages from the repeating units is not possible.

Moreover, the objective of DAHLBERG is not to increase the voltage output (or voltage input in the case of electrolysis cells), but to increase the compactness of the construction of fuel cells/ electrolysis cells (column 1, lines 43-45 of Dahlberg). In fact, voltage output or input is not mentioned at all in DAHLBERG.

The person skilled in the art would have therefore immediately recognized that the repetition of structural elements in a cell of DAHLBERG serves to increase the cell's compactness, and, thus, would not have been tempted to modify the biofuel cell of KIM '069 and CHAO with a bipolar stacked design in order to increase voltage output in order to approach the invention defined by independent claims 1 (which includes the features of claim 2), 19 and 20.

Furthermore, the combination of these documents does not teach the features of independent claim 1.

The combination of KIM '069, CHAO and DAHLBERG fails to teach or suggest channels provided by the partition wall. That is, none of these documents mentions that the partition wall may be designed in a compartmented way, thereby providing the channels. In this way, a reinforced construction is obtained, allowing that the plates can be pressed together firmly so that a

good contact is obtained between all parts. See, e.g., specification page 6, lines 24-28.

For example, while DAHLBERG may disclose grooves that are present in the plates in the cell, these grooves are not comparable to the channels in a cell of the claimed invention. The plates are made of pyrolytic graphite or nickel and serve as the anode and cathode (column 1, lines 59-60 of DAHLBERG). On the other hand, the claimed channels of the cell are made of partition wall material, which is a porous, electronically non-conductive and non-ion-selective material.

Therefore, the proposed combination of KIM '069, CHAO and DAHLBERG fails to render obvious claims 1 (which now includes the features of 2), 3, 19 and 20, and withdrawal of the rejection is respectfully requested.

Claims 11 and 14-16 stand rejected under 35 USC 103(a) as being unpatentable over KIM '061 in view of CHAO, further in view of HABERMANN; claim 12 stands rejected under 35 USC 103(a) as being unpatentable over KIM '061 in view of CHAO, further in view of RICHTER, claim 13 stands rejected under 35 USC 103(a) as being unpatentable over KIM '061 in view of CHAO, further in view of HERTL et al. US 4,578,323 ("HERTL"); claim 18 stands rejected under 35 USC 103(a) as being unpatentable over KIM '061 in view of CHAO, further in view of YAMAMOTO US 4,883,724 ("YAMAMOTO"); claim 22 stands rejected under 35 USC 103(a) as

being unpatentable over KIM '061 in view of CHAO, further in view of YING et al. US 6,183,091 ("YING").

These rejections are respectfully traversed for the reasons that follow.

KIM '061 and CHAO, as discussed previously fail to teach the claimed invention of independent claim 1.

Regardless of the ability of any of HABERMANN, RICHTER, HERTYL, YAMAMOTO, and YING to teach that for which they are offered, none of these documents suggest two or more pairs of electrodes and multiple partition walls in a bipolar stacked design, as included in independent claims 1, 18 and 22 or that each partition wall provides at least two types of channels, wherein the open spaces of one type of channel are in electrically conductive contact with the cathode and open spaces of the other type are in electrically conductive contact with the anode, as further recited in claim 1. Thus, none of HABERMANN, RICHTER, HERTYL, YAMAMOTO, and YING is able to remedy the shortcomings of KIM '061 and CHAO for reference purposes with respect to independent claim 1.

Therefore, the combination fails to render obvious claims 1, 11-16, 18 and 22, and withdrawal of the rejection is respectfully requested.

**Conclusion**

In view of the amendment to the claims and the foregoing remarks, this application is in condition for allowance at the time of the next Official Action. Allowance and passage to issue on that basis is respectfully requested.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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